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ABSTRACT

Evaluations of the relationship of curriculum programs to Jean Piaget's developmental psychology theory are reviewed. These programs include Science Curriculum Improvement Study (SCIS), Man: A Course of Study (MACOS), Family of Man (FOM), and Social Encounter and Research Curriculum for Humanization (SEARCH). Piagetian based research results are also included. Results of the SCIS study indicate that the curriculum is superior for developing the processes of scientific investigation, and that SCIS students are more diverse, creative, and show greater gains in reading, mathematics, and social studies than control groups. MACOS results show that students retain a significant amount of information, boy/girl differences associated with achievement disappear, group participation and interaction increase, and positive change in teaching style occurs. FOM results indicate a strong relationship between concrete, manipulative materials for children, and increased pupil achievement. Research examining the relationship between social studies instruction and Piagetian theory found that elementary social studies programs should focus on the cognitive stages of concrete operations, materials should be concrete objects, that a discovery approach is best, and that group discussions improve thinking. The author states that the SEARCH project may be the innovative curricular program that applies Piagetian thought to social studies. Also, social studies education would benefit from Piagetian based research by development of curriculum, Piagetian-based methods texts for preservice and inservice teacher education, and a concentrated effort to relate Piaget's psychology to learning. (Author)

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Implications of Piaget's Research for the Inquiry Process of Learning.
A paper presented at the 1979 Annual Convention of the National Council for Social Studies.

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The social studies curriculum has received some attention in the area of values development from curriculum developers and parents alike. A concern for teaching moral development in the schools was evidenced by the seventh and eighth annual Gallop Poll of public attitudes toward education, reporting that 79% and 67% of the respondents respectively favoring instruction dealing with moral development.[1] Lawrence Kohlberg has taken a systematic approach to curriculum development based upon Piaget's research on moral development. However, most attempts at the development of social studies material have not succeeded in linkirg developmental child psychology ala Piaget, to curriculum development. Programs like MACOS[2], TABA[3], MATCH[4], FOM[5], People and Technology[6], have had their design related to developmental psychology.

Piaget's research as well as Herbert Thelen's and John Dewey's, would support meaningful learning as initiated from within the learner, and Piaget has had his greatest impact upon learning by providing elementary school children with more concrete learning experiences and with the use of manipulative materials. If we can look at the research which has accumulated from the National Science Foundation (NSF) elementary school science programs, one would find interesting, positive results related to student achievement, something which is difficult to document in most innovative programs. The SCIS[7] program based upon Piaget's research on cognitive development in children has yielded the following results[8].

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1. The results of the study indicate that the SCIS curriculum was superior to a textbook program for developing the six processes of scientific investigation (observation, classification, measurement, experimentation, interpretation, predication).
2. There was an observable difference in the manner in which both groups of subjects approached the solution to the process-oriented tasks. The SCIS students were more aggressive in their approach. By contrast, many students in the textbook group did not touch the materials while attempting a solution. The entire textbook group was more passive.
3. SCIS students were more diverse, persistant, and creative in their experimental designs, more capable of diverse mental operations-problem solving skills.
4. On conservation reasoning tasks, the SCIS group outperformed the control group in total gains between pre-and post-tests. Also noteworthy, the first year units helped children, lacking preschool education, to gain in conservation skills. Hence, there might be a correlation between progress in first grade and conservation ability.
5. Related to reading and reading readiness, the students in the SCIS group showed greater gain in 5 of the 6 reading subtest areas (word meaning, listening, matching, alphabet, numbers). Maybe, to best teach beginning reading, first teach thinking as represented by conservation reasoning.
6. Achievement in reading, mathematics, and social studies showed the experimental SCIS group outperforming the control group on every subtest of the Stanford Achievement Series (mathemetical applications, social studies skills, paragraph meaning). Apparently, children who have had experience with SCIS units, tend to utilize higher power thinking skills.

7. Teacher behavior has also shown improvement. SCIS involved their children in twice as many science experiences as did non-SCIS teachers. Teachers asked more questions which required a higher level of thought than did non-SCIS teachers, who asked more recall and recognition questions.

Other studies relating to improved teacher behavior and student performance have been summarized in the ERIC Center for Science, Mathematics, and Environmental Education.[9] The possible effects upon improving social studies education for children can be as far-reaching as considering Piaget's research concerning cognitive development in children.

Now, let us focus attention on the limited research on social studies curriculum programs and Piagetian-based research studies. Man A Course of Study (MACOS) and the Family of Man (FOM) have had very extensive field-tested and research-based program development. And we are talking about innovative programs which command less than 15% of the commercial market.

Research-based Curriculum Materials

MACOS results[10] based upon the Brunerian approach to curriculum have shown:

1. Children acquired and retained a significant amount of information and developed increased ability to reason.
2. Boy-girl differences associated with school work disappeared.
3. Individual differences are not associated with student's intelligence or previous knowledge of the area. Students with poor academic background gained in learning and mastering over the ideas and concepts as much as those whose beginning positions were much stronger. The most knowledgeable students also made equally large gains. Neither group sacrificed at the expense of the other.

4. Reinforcement of an idea through various media and creative exercises resulted in substantial gain in learning. Active involvement in projects became powerful motivation for learning the abstract.
5. Group participation and interaction were increased and rated highly by students. Communication skills were major growth areas in children as viewed by teachers.
6. Positive changes in teaching style were attributable to the program.

The Family of Man (FOM)[11] results have shown a strong relationship between concrete, manipulative materials for children and increased pupil achievement:

1. Children noticed significantly more differences in environmental use and similarities between themselves and people of other cultures.
2. Children had a more favorable view toward foreign people and cultures, also toward all people.
3. The FOM students scored better on the Primary Social Studies Test and had more positive attitudes toward social studies and school.
4. Children using the materials scored significantly higher on SRA/EIS instruments than national norms, with a cumulative effect in later grades.
5. Lower scoring children had more ascendency over norms than high scoring children, with all grade levels in the program scoring significantly higher than norms group.
6. A cost analysis comparing FOM to seven other textbook programs showed the first year and fifth year cost under all other programs.

Piagetian-Based Research Studies

Irving E. Sigel[12] is one of the researchers looking at this area in relation to social studies instruction. He has found the following relationship in social studies to Piaget's research:

1. The process of classification can be the focus of social science

curriculum relating to Piaget's theory of cognitive development.

2. The cognitive stage of concrete operations, as defined by Piaget, should focus elementary school social studies programs and materials on concrete objects.
3. His research efforts have shown that using a discovery-type approach, guided by the teacher, is better than other methods.
4. If children at an early age are exposed to experiences that broaden categorization, it would facilitate thinking in more original ways.

Roy Hallam[13] found the following to be evidenced in the teaching of history:

1. Piaget's level of formal operations, when subjects are able to reason by implication at an abstract level and to postulate hypotheses, was reached after a chronological age of 16.2-16.6 years. Therefore, formal thinking in history develops relatively late in the secondary school. Research work indicates that it is useless to present abstract material to pupils before they are ready to assimilate it.
2. Piaget recommends discussion, especially with one's peers, as a major educational method for improving thinking. Divide your class into small groups of 4-5 children for discussions.
3. Cooperation is necessary for intellectual and moral development.
4. Ancient history is more comprehendable for students because it can be taught as a concrete subject using homes, pyramids, calendars, food, clothing, diagrams, maps, model building, and visits.

The Social Encounter and Research Curriculum for Humanization (SEARCH)[14] project may be the innovative curricular program that strives to apply Piaget to social studies education by emphasizing the use of individualized instruction. The Piagetian stages of intellectual development are defined and related to curriculum development:

Sensory-Motor Stage: birth to 2 years

Coordination of perceptual-motor functions occurs before formalized school.

Preoperational Stage: Approximate ages 2-7

Preschool and primary education

Self-centered pupil orientation

unconcerned about logic

cannot classify

Play and reality are the same

Cannot conserve

Concrete Operations: Approximate ages 7-11

oriented toward concrete examples and objects

elementary school education

conservation patterns develop

believe what they see only

classification begins

beginnings of logical thought

Formal Operations: Approxiamte ages 11-15 - adult

abstract thinking

forms hypotheses

predicts

concrete experiences not always necessary

combines mental operations

These stages develop in a sequential order and the child must proceed through each stage in order to achieve logical thinking. Most elementary school children should be exposed to concrete situations (concrete operations stage) avoiding the abstract forms of thinking (formal operations stage).

Curriculum development in the form of a Piagetian-model for teacher training was developed by Richard Copeland in the form of a methods textbook for pre-service and in-service teachers. He used the teaching implications of Piaget's research in developing the text on How Children Learn Mathematics,[15] Many mathematical concepts are introduced to elementary school children too soon and in an abstract fashion according to Piaget's developmental levels. Copeland's approach is to look at a different way to introduce these concepts, more concretely according to Piaget.
Ronald Good has just completed a Piagetian-based elementary school science methods book called How Children Learn Science.[16] These models could hold a key to developing social studies methods textbooks for teachers and might eliminate some failure in schools because of the abstract nature of reading, math, and social studies programs for children.

THE NEED

It would seem to this writer that social studies education would benefit greatly from attention to Piagetian-based research in the following ways:

1. Development and dissemination of on-going and future curriculum programs relating to pupil materials based upon Piaget's cognitive stages of development.
2. Development and dissemination of Piagetian-based social studies methods textbooks for preservice and inservice teacher training.
3. Application for Federal projects to assist in these above developmental areas, e.g. NSF, NIE.
4. Increased awareness and implementation in schools of Piagetian-based programs to assist child learning through the use of more concrete and manipulative materials.
5. A concentrated effort by the creative minds in social studies education to relate Piaget's developmental psychology to learning materials for children in the area of social studies.

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